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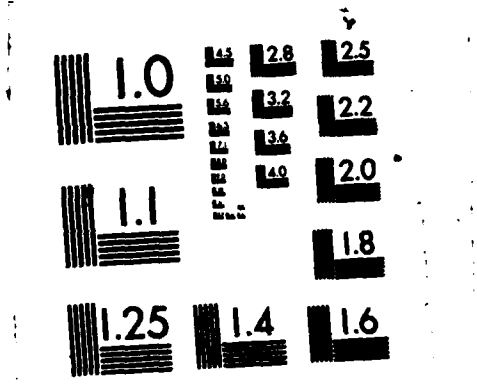

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The objective of the research supported by the grant to grow expitaxial III-V semiconductor films using gaseous source materials for molecular beam epitaxy(MBE). The grant provides the critical equipment items needed to customize an existing commercial MBE system and allow growth of heteroepitaxial structures that can not be fabricated by other existing techniques.

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Interim Status Report

to the

Air Force Office of Scientific Research

for

URIP Grant No. AFOSR-87-0028

(1 Oct. 1986 to 30 Sept. 1987)

entitled

"Gas Source MBE"

at

Colorado State University

Fort Collins, CO 80523

PI: Gary Y. Robinson

Department of Electrical Engineering

(303) 491-6575

March 1987

Interim Status Report

AFOSR Grant # AFOSR-87-0028

This report describes the progress made during the first six months of the DoD University Research Instrumentation Program grant for "Gas Source MBE" at Colorado State University. The grant began on October 1, 1986, is of 12-months duration, and is in the amount of $194,000.00.

The objective of the research supported by the grant to grow epitaxial III-V semiconductor films using gaseous source materials for molecular beam epitaxy (MBE). The grant provides the critical equipment items needed to customize an existing commercial MBE system and allow growth of heteroepitaxial structures that can not be fabricated by other existing techniques.

During the first six months of the grant, the following equipment items (as numbered in the original proposal) have been ordered, received, and are currently in use:

Item 3. Vacuum system for pumping H_2 gas load from the MBE growth chamber,

Item 4. Residual gas analyzer, and

Item 6. Surface profilometer.

The following equipment items are on order and are expected to arrive before the end of the grant period:

Item 1. Gas storage cabinet and special hydride gas delivery system,

Item 2. Toxic gas monitors and alarm system, and

Item 5. Double crystal X-ray diffractometer with computer control system.

Before ordering items 1 and 2, a considerable design effort was undertaken to ensure that the gaseous hydrides could be introduced into the UHV MBE system in a safe, controlled fashion. Item 1 is being constructed to our specifications by a gas cabinet vendor and will require additional custom work on our part after delivery of the vendor's equipment. Item 2 consists of two toxic gas monitors: one is very sensitive, requires periodic service, and will serve as the primary sensor; and the other monitor is less sensitive, requires little service, and will serve as a backup sensor. An integrated alarm system will be used to tie the two monitors together. Item 5 took several months for bidding and selection and is due for delivery in the seventh month of the grant.

The above equipment will be put into operation in the MBE Laboratory (Eng. Bldg. romm C001) and the Solid State Characterization Laboratory (Eng. Bldg. rooms C004 and C012) at Colorado State University.

The procurement process for the equipment under the DoD URIP grant is on schedule and the gas source MBE system will be operation before the end of the grant period.

END

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